MISCELLANEA ZOOLOGICA HUNGARICA
Tomus 13. 2000 p. 47–58

Checklist, distribution maps and bibliography of large branchiopods in Hungary (Anostraca, Notostraca, Spinicaudata, Laevicaudata)

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(Received July 31, 2000)

Abstract: A checklist of large branchiopods containing 19 species from Hungary is given. The history of the scientific investigations of Anostraca, Notostraca, Spinicaudata and Laevicaudata is briefly reported. For each species the following data are provided: important synonyms, localities from Hungary with the reference number of the publication and unpublished data. Distribution is mapped using the UTM grid system.
Keywords: Crustacea, Branchiopoda: Anostraca, Notostraca, Spinicaudata, Laevicaudata, Hungary, mapping

Introduction

Studies on the Hungarian Crustacea fauna started in the middle of the 19th century and also included investigations on large branchiopods. The first papers (Chyzer & Tóth 1857a, b) already dealt with anostracans, later Daday (1910, 1913) summarised the data on Anostraca and Conchostraca. Unfortunately, no comprehensive review on the large branchiopods of Hungary were published since that time, though several papers dealt with these species and some more new members in the Hungarian fauna were detected. This checklist is aimed to provide a summary of the previous data in the hope it helps to "revive" the researches on Hungarian large branchiopods.

The purpose of this paper is to provide a checklist of large branchiopods in Hungary, and to briefly review and summarise the information on their taxonomy, natural history and ecology, published so far. The present checklist, containing 19 species, is based on all records published in the literature from the present area of Hungary. The following data are provided for each species on the checklist: (a) important synonyms; (b) localities with numbers of bibliographic references. In addition to the published data, unpublished records of the author and of the collections of the Hungarian Natural History Museum are also mentioned and shown on the maps. The distribution of each species in Hungary is mapped using the UTM grid system. The maps are attached at the end of the paper.

History

The first papers on the anostracan fauna of Hungary mentioned *Branchinecta ferox*, *Branchipus schaefferi*, *Streptocephalus torvicornis* and *Siphonophanes grubii* from the region of Budapest (Brühl 1860, Chyzer 1858, 1861a, b, Chyzer & Tóth 1857a, b). Three further species (*Branchinecta orientalis*, *Tanymastix stagnalis* and *Chirocephalus carnuntanus*) were listed by Daday (1887, 1889, 1890, 1896) from other parts of the country, too. Thereafter four other species were also found: *Chirocephalus hankoi* was recorded by

Dudich (1933), *Chirocephalus shadini* was collected by Kertész (1956a), originally described as *Pristicephalus hungaricus* n.sp., he has also distinguished the new form *Branchipus visnyai* (Kertész 1956b), and first found *Chirocephalus diaphanus* in Hungary (Kertész 1958). Of these eleven taxa several ones were also found in the last years, but some, such as *B. visnyai*, *C. hankoi and C. diaphanus* are known only from one locality.

The two notostracans were mentioned already in the earlier publications (e.g. *T. cancriformis* by Chyzer (1858), *Lepidurus apus* by Örley (1886a, b), the former one being much more abundant.

The otherwise rather rare laevicaudatan *Lynceus brachyurus* was first detected by Chyzer (1858) and found also in recent years. Chyzer (1858) found *Leptestheria dahalacensis*, later *Cyzicus tetracerus* (Chyzer 1861a,b) and *Eoleptestheria ticinensis* (Chyzer 1892). Abonyi (1910, 1911) first found *Limnadia lenticularis* near Budapest and Makó, and Kertész (1958) collected *Imnadia yeyetta* for the first time in Hungary. A summary of the Hungarian "Conchostraca" fauna was published by Daday (1913).

The remaining papers not mentioned above are mostly faunistical publications or in some cases limnological studies, where records of large branchiopod species are given.

Taxonomy

Both the nomenclature and the taxonomy used in the present paper follow Belk & Brtek (1995) and Brtek & Thiéry (1995).

1. Dudich (1926) recorded – with question mark *Chirocephalus spinicaudatus* var. *chyzeri* from Bátorliget, this record was also listed by Megyeri (1953) as *C. spinicaudatus*, but new material was not found in the latter study, and even a more recent investigation (Forró 1991) did not yield any specimen of this taxon. Kertész (1955) – in the introduction of his paper – mentioned that he carried out a study aimed at concerning its taxonomical status, however, no results were published later. Because of the uncertainities this taxon was omitted from the present checklist.

2. Kertész (1956b) described a new form of *Branchipus stagnalis* f. *visnyai* from Kőszeg, and it was considered a valid species by Cottarelli (1969), Belk & Brtek (1995) accepted this opinion and – at the same time – emphasised the need of a detailed comparison with *B. schaefferi*. This view was accepted here and hence *B. visnyai* is listed in the checklist.

Discussion

Altogether 19 large branchiopod (11 Anostraca, 2 Notostraca, 5 Spinicaudata, 1 Laevicaudata) species are now known from the present area of Hungary. K. Chyzer, E. Daday and more recently G. Kertész have worked specifically on these groups in Hungary, while in the last 40 years nobody dealt with the scientific (taxonomical, faunistical, ecological) study of these animals, though in most parts of the world the research activities aimed at these groups were intensified This greater interest partly comes from nature conservation issues and for this reason it would also be highly desirable to carry out detailed investigations on the occurrence and distribution of large branchiopods in Hungary. At present there are some areas where *Triops cancriformis*, *Branchipus schaefferi* and *Streptocephalus torvicornis* were frequently found, in sodic waters *Branchinecta ferox* and *B. orientalis* were recorded.

List of species

Anostraca

Branchinectidae

Branchinecta ferox (Milne-Edwards, 1840)

Loc. Apajpuszta (34); Bugac (33, 40, 41); Farmos (30, 31); Fülöpháza (25, 44); Hajdúszoboszló (33); Hortobágy (29); Jászberény (21); Kecskemét (15, 16, 17, 21); Kistelek (22, 23); Szerep (17, 24); Tass (6, 7, 12, 15, 16, 17, 35, 21); — Fülöpszállás, Makó, Szeged, Tiszacsege (unpubl. data)

Branchinecta orientalis Sars, 1901

Loc. Balástya (33); Bugac (33, 40, 41); Hortobágy (29); Farmos (30, 31); Kardoskút (43); Kecskemét (17); Kopáncs (42); Lajosmizse (33); Nyíregyháza (33, 41) — Szabadszállás, Fülöpszállás, Tiszavasvári (unpubl. data)

Branchipodidae

Branchipus schaefferi Fischer, 1834

Syn.: *B. stagnalis*
Loc. Aggtelek (30, 32); Babócsa (28); Balatonlelle (32); Bélavár (28); Budapest (6, 7, 10, 15, 16, 17, 32, 35, 45, 46); Diósjenő (39); Drávakeresztúr (28); Drávaszentes (28); Farmos (30, 31); Hajdúszoboszló (32); Kecskemét (15, 16, 17, 32); Kisújszállás (32); Kővágóörs (3, 32); Makó (2); Mezőcsát (32); Nagyiván (29); Somogyudvarhely (28); Szabadkígyós (33); Szántód (17, 32); Székesfehérvár (32); Újszentmargita (29) — Apajpuszta, Bakonyszentiván, Berettyóújfalu, Budakalász, Fonyód, Hencida, Hortobágy, Kömlő, Pomáz, Poroszló, Pusztaszer, Sopron, Süttő, Tiszanána, Tiszavasvári (unpubl. data)

Branchipus visnyai Kertész, 1956

Syn.: *B. stagnalis* f. *visnyai*
Loc. Kőszeg (32)

Tanymastix stagnalis (Linnaeus, 1758)

Syn. *Tanymastix lacunae*
Loc. Farmos (30, 31, 33), Kecskemét (15, 16, 17, 30, 33); Mezőcsát (33); Szabadkígyós (33); Szeged (33) — Apajpuszta, Furta, Ókígyós (unpubl. data)

Streptocephalidae

Streptocephalus torvicornis (Waga, 1842)

Loc. Apajpuszta (34); Budapest (5, 7, 15, 16, 17,35, 45, 46); Felsőörs (17); Gönyü (33); Hajdúszoboszló (41); Karcag (41); Kecskemét (15, 16, 17); Kővágóörs (3); Makó (2); Sátoraljaújhely (17); Szabadkígyós (33); Szeged (36, 41); Szőny (33); Tokaj (15, 16, 17); Újszentmargita (29) — Budakalász, Egyek, Lajosmizse, Mezőcsát, Tiszacsege (unpubl. data)

Chirocephalidae

Chirocephalus carnuntanus (Brauer, 1877)

Loc. Apajpuszta (20, 34); Bugac (40, 41); Csépa (41); Farmos (30, 31); Hortobágy (29, 41); Kecskemét (15, 16, 17, 30); Kétegyháza (33); Kistelek (22, 23, 30); Kunszentmiklós (20); Mezőcsát (30); Szabadkígyós (33) — Balmazújváros, Fülöpszállás, Gáborján, Gyomaendrőd, Kömlő, Ókígyós, Szabadszállás (unpubl. data)

Chirocephalus diaphanus Prévost, 1803

Loc. Szabadkígyós (32)

Chirocephalus shadini (Smirnov, 1928)

Syn. *Pristicephalus hungaricus*
Loc. Bátorliget (26); Farmos (31)

Eubranchipus hankoi (Dudich, 1927)

Loc. Jászberény (21)

Eubranchipus grubii (Dybowski, 1860)

Syn.: *Branchipus hungaricus* Chyzer, and listed as *Branchipus diaphanus* by Chyzer (1858)
Loc. Bátorliget (26); Budapest (7, 8, 15, 16, 17, 35, 45, 46); Szabadkígyós (33)

Notostraca

Triopsidae

Lepidurus apus (Linnaeus, 1758)

Loc. Baja (19); Budapest (16, 35, 45, 46); Jászberény (21); Mezőcsát (48); Simontornya (19); Tokaj (19) — Kömlő, Vörs (unpubl. data)

Triops cancriformis (Bosc, 1801)

Loc. Apajpuszta (34); Babócsa (28); Békésszentandrás (47); Bélavár (28); Budapest (1, 7, 8, 10, 16, 35, 45, 46); Drávakeresztes (28); Drávaszentes (28); Hortobágy (29); Kistelek (22, 23); Kopáncs (42); Kővágóörs (3); Mezőcsát (48); Nagyiván (29); Pusztabánréve (47); Révfülöp (3); Szeged (36); Újszentmargita (29) — Gönyü, Mátrafüred, Nagybajcs, Poroszló, Tiszacsege (unpubl. data)

Spinicaudata

Cyzicidae

Cyzicus tetracerus (Krynicki, 1830)

Loc. Budapest (8, 9, 16, 18, 45); Kalocsa (9); Kecskemét (18); Sátoraljaújhely (9, 16, 18); Tokaj (9, 18) — Balmazújváros, Mezőcsát, Nagybajcs (unpubl. data)

Leptestheriidae

Leptestheria dahalacensis (Rüppell, 1837)

Syn.: *Estheria pesthinensis* Brühl, listed as *Limnadia Hermanni* in Chyzer 1858, Chyzer & Tóth 1861a, b

Loc. Apajpuszta (34); Békésszentandrás (47); Budapest (5, 6, 7, 8, 9, 10, 16, 18, 35); Kalocsa (18); Kopáncs (42); Makó (2); Szőny (34) — Hortobágy, Kömlő, Kunszentmiklós, Sopron (unpubl. data)

Eoleptestheria ticinensis (Balsamo-Crivelli, 1859)

Loc. Alsóbereczki (9, 18); Sárazsadány (9, 18); Sátoraljaújhely (16); Tokaj (9, 18) — Apajpuszta, Szigetbecse (unpubl. data)

Limnadiidae

Limnadia lenticularis (Linnaeus, 1761)

Loc. Békésszentandrás (47); Budapest (1, 2, 18); Hortobágy (29); Makó (2, 18) — Gönyü, Győrújfalu (unpubl. data)

Imnadia yeyetta Hertzog, 1935

Syn.: *Imnadia voitestii*

Loc. Apajpuszta (34) — Gönyü, Győrújfalu, Mezőcsát, Szőny (unpubl. data)

Laevicaudata

Lynceidae

Lynceus brachyurus O. F. Müller, 1776

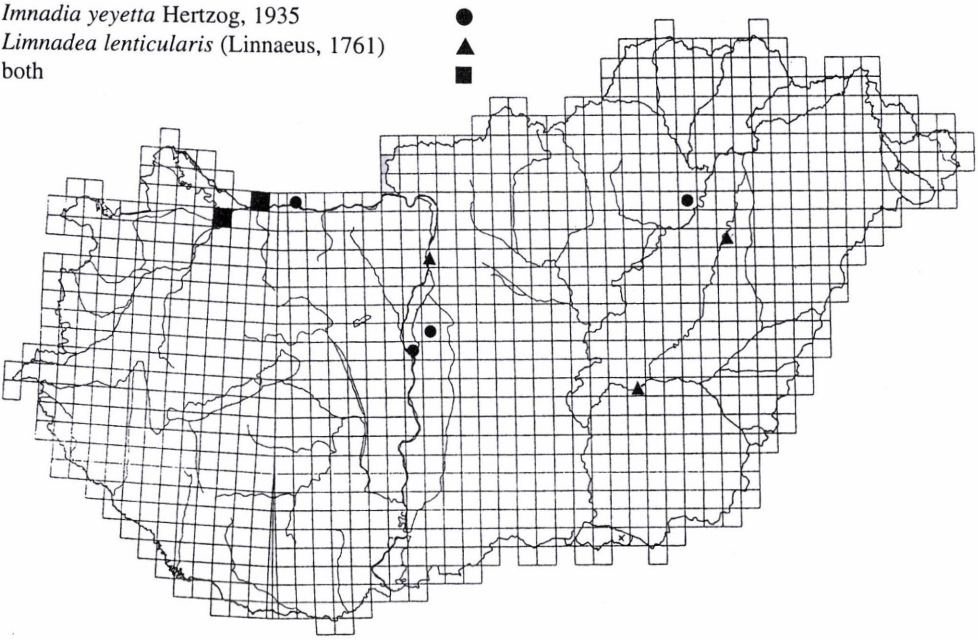
Syn.: *Limnetis brachyurus*

Loc. Balmazújváros (29); Bátorliget (38); Budapest (6, 7, 16, 18, 35, 45, 46) — Hortobágy, Mezőcsát, Nyírbátor (unpubl. data)

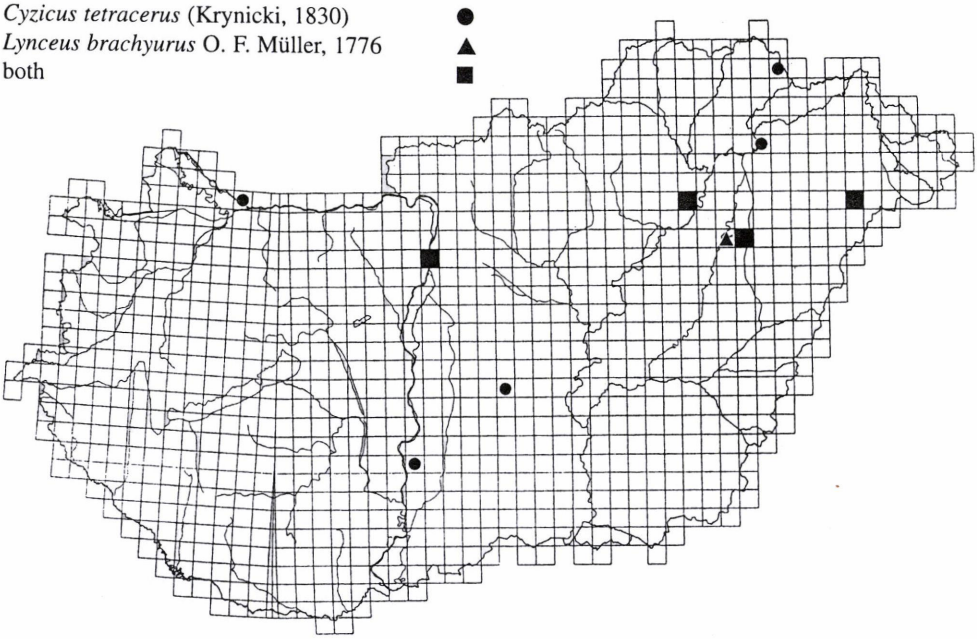
Acknowledgements

Thanks are due to N. Szederkényi for technical assistance. Data collection and preparation of the paper were partly supported by the 1-0142/98 KKA project of the Ministry for Environment.

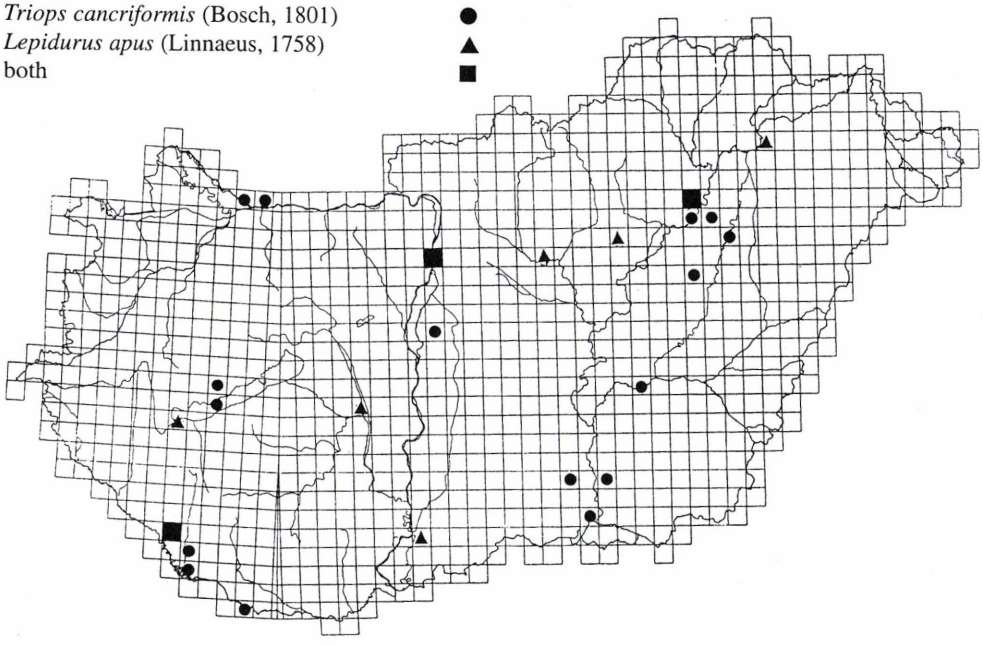
Imnadia yeyetta Hertzog, 1935 ●
Limnadea lenticularis (Linnaeus, 1761) ▲
both ■



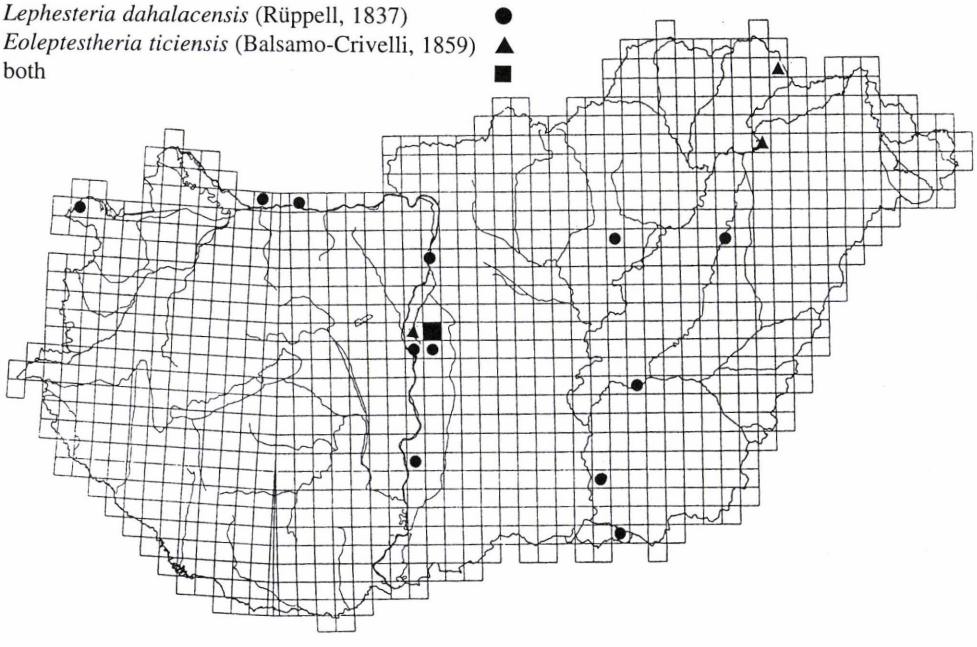
Cyzicus tetracerus (Krynicki, 1830) ●
Lynceus brachyurus O. F. Müller, 1776 ▲
both ■



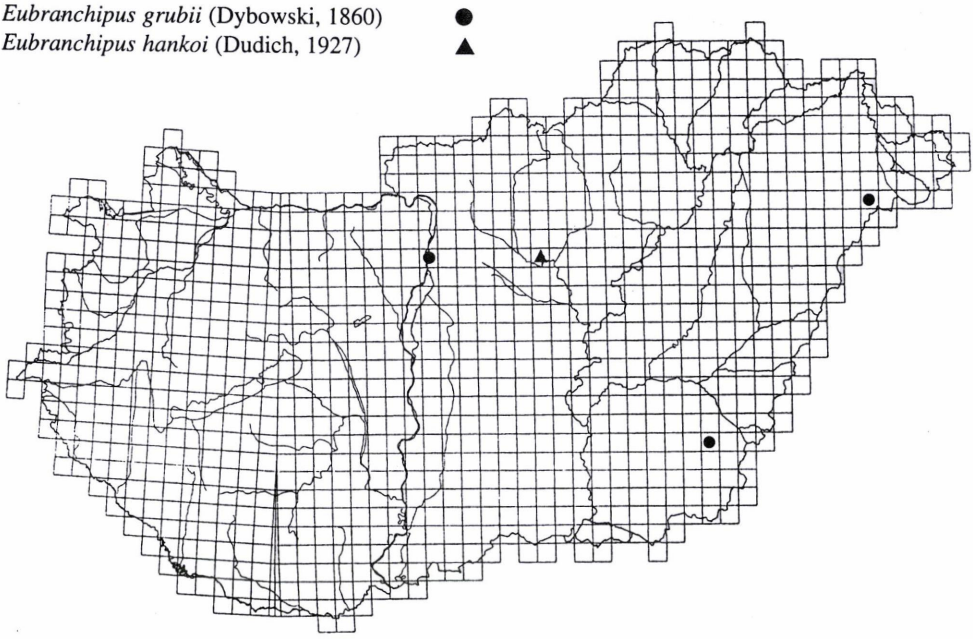
Triops cancriformis (Bosch, 1801) ●
Lepidurus apus (Linnaeus, 1758) ▲
both ■



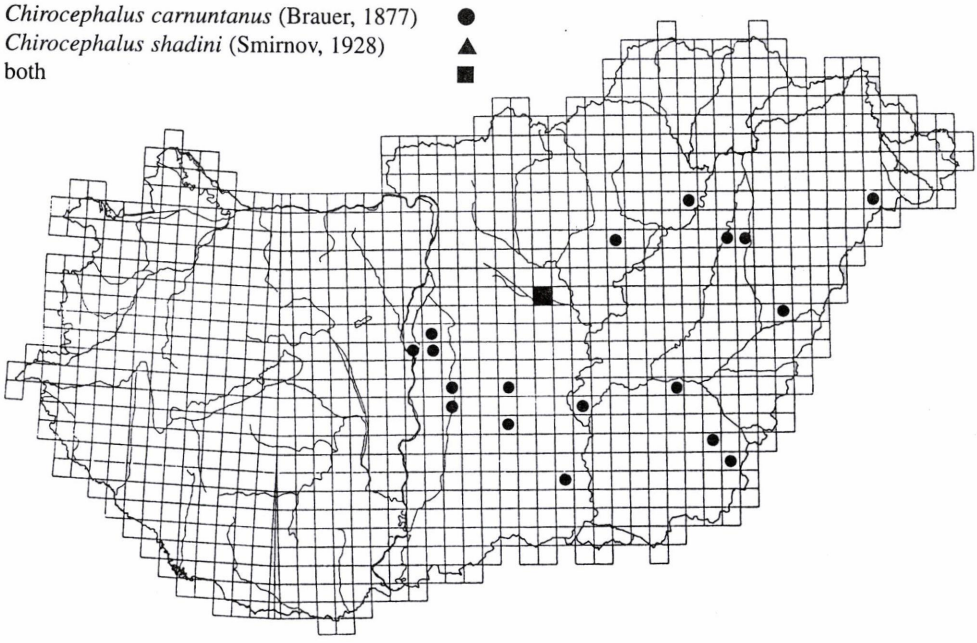
Lephesteria dahalacensis (Rüppell, 1837) ●
Eoleptestheria ticiensis (Balsamo-Crivelli, 1859) ▲
both ■



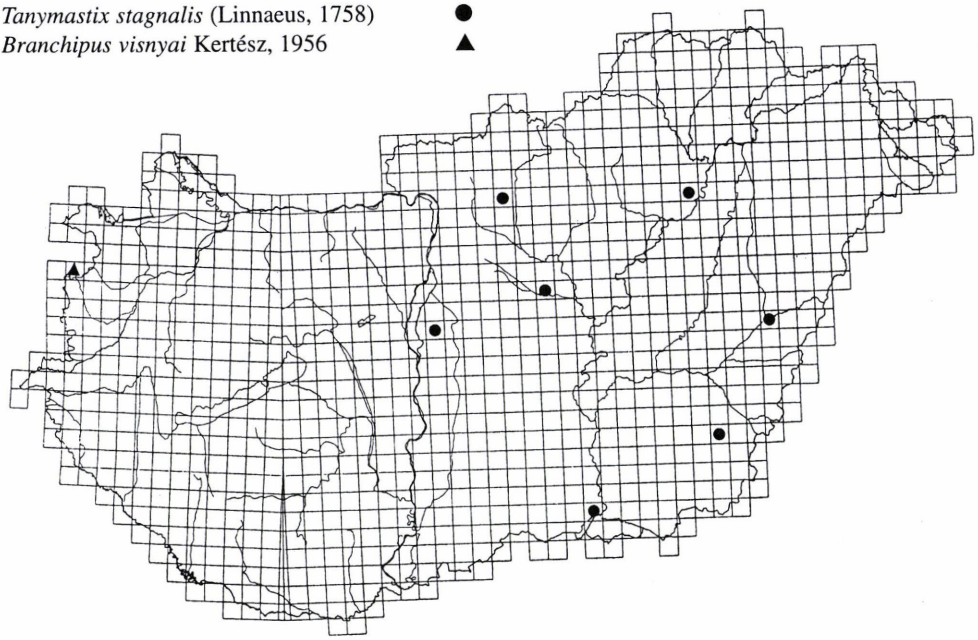
Eubranchipus grubii (Dybowski, 1860) ●
Eubranchipus hankoi (Dudich, 1927) ▲



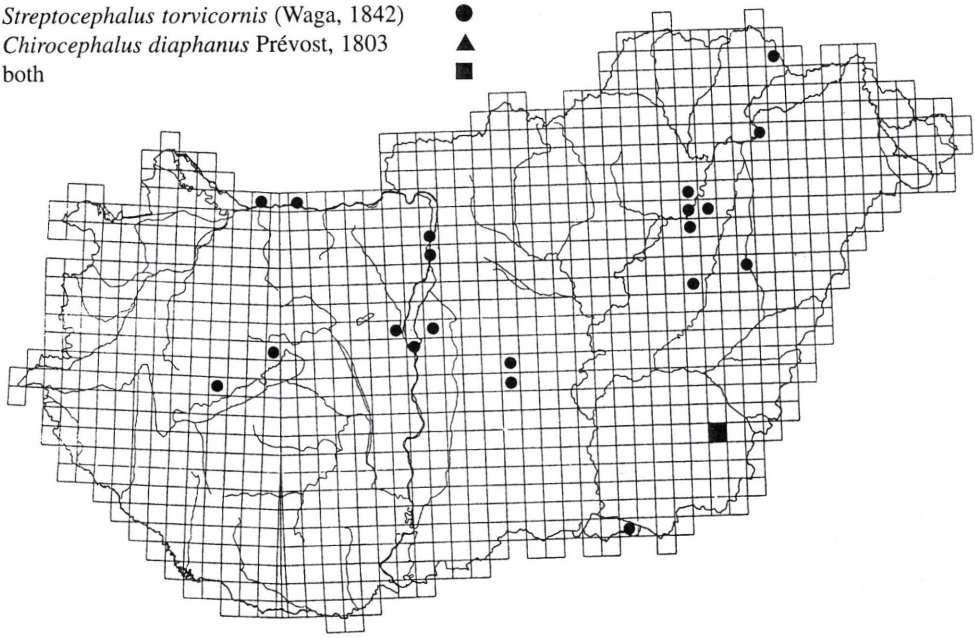
Chirocephalus carnuntanus (Brauer, 1877) ●
Chirocephalus shadini (Smirnov, 1928) ▲
both ■



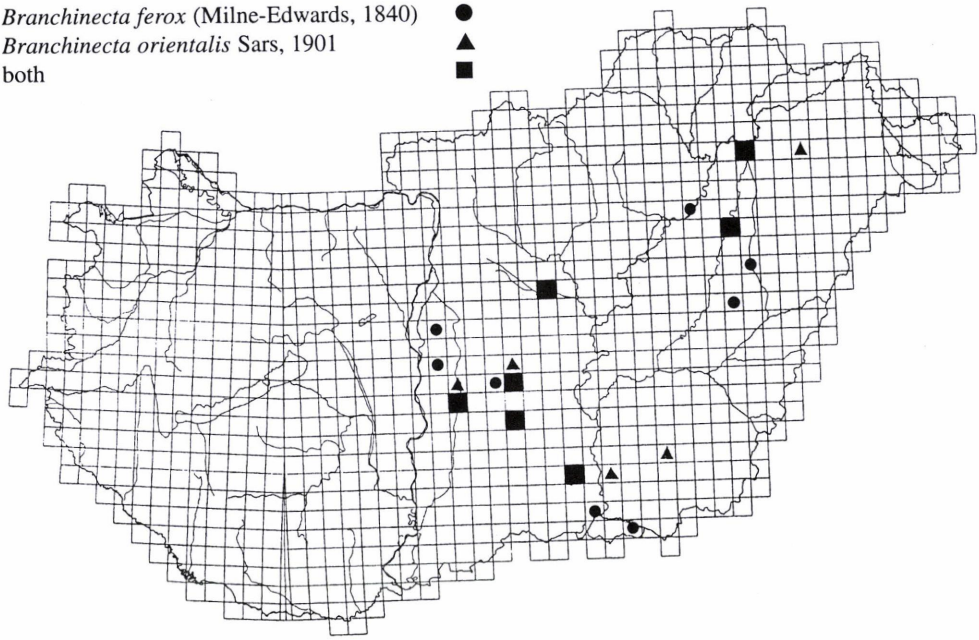
Tanymastix stagnalis (Linnaeus, 1758) ●
Branchipus visnyai Kertész, 1956 ▲



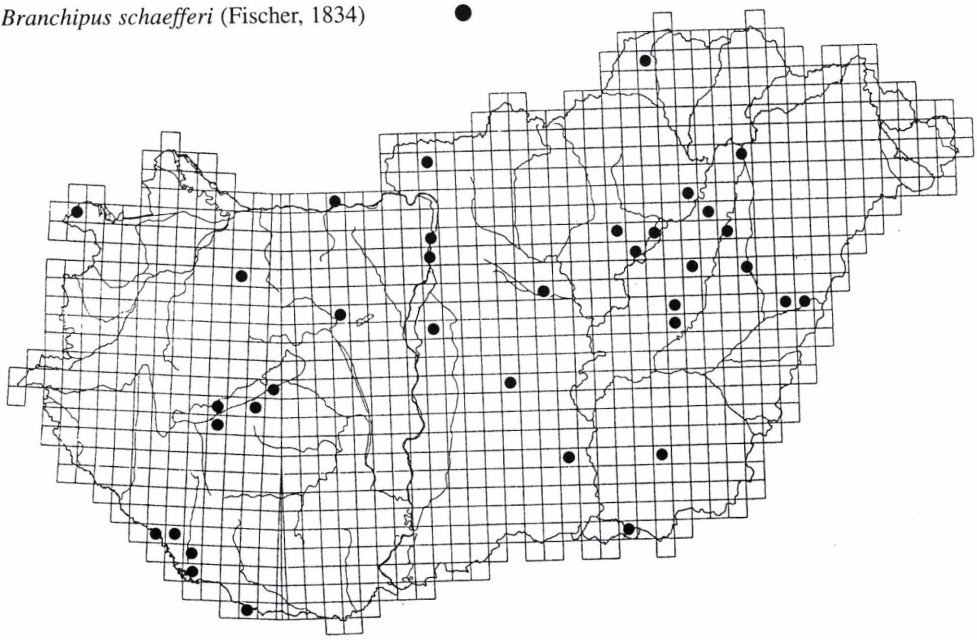
Streptocephalus torvicornis (Waga, 1842) ●
Chirocephalus diaphanus Prévost, 1803 ▲
both ■



Branchinecta ferox (Milne-Edwards, 1840) ●
Branchinecta orientalis Sars, 1901 ▲
both ■



Branchipus schaefferi (Fischer, 1834) ●



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